

<b>NOTICE OF REVISION (NOR)</b>		1. DATE (YYMMDD) 95-04-11		Form Approved OMB No. 0704-0188	
THIS REVISION DESCRIBED BELOW HAS BEEN AUTHORIZED FOR THE DOCUMENT LISTED.					
<small>Public reporting burden for this collection is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSED. RETURN COMPLETED FORM TO THE GOVERNMENT ISSUING CONTRACTING OFFICER FOR THE CONTRACT/ PROCURING ACTIVITY NUMBER LISTED IN ITEM 2 OF THIS FORM.</small>				2. PROCURING ACTIVITY NO.	
				3. DODAAC	
4. ORIGINATOR		b. ADDRESS ( <i>Street, City, State, Zip Code</i> ) Defense Electronics Supply Center 1507 Wilmington Pike Dayton, OH 45444-5270		5. CAGE CODE 67268	
a. TYPED NAME ( <i>First, Middle Initial, Last</i> ) Steve L. Duncan				7. CAGE CODE 67268	
				6. NOR NO. 5962-R111-95	
				8. DOCUMENT NO. <b>5962-87617</b>	
9. TITLE OF DOCUMENT MICROCIRCUIT, DIGITAL, HIGH VOLTAGE DRIVERS, HYBRID			10. REVISION LETTER		11. ECP NO. Registered users contacted by phone
			a. CURRENT A	b. NEW B	
12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES All					
13. DESCRIPTION OF REVISION  Sheet 1: Revisions ltr column; add "B". Revisions description column; add "Changes in accordance with NOR 5962-R111-95". Revisions date column; add "95-04-11". Revision level block; add "B". Rev status of sheets; for sheets 1 and 6 add "B".  Sheet 6: Table I: For the test Fall time ( $t_F$ ) change max limit from 1.5 $\mu$ s to 1.7 $\mu$ s.  Sheet 6: Table I: For the test Turn off time ( $t_{OFF}$ ) change max limit from 5.2 $\mu$ s to 8.0 $\mu$ s.					
14. THIS SECTION FOR GOVERNMENT USE ONLY					
a. ( <i>X one</i> )	X	(1) Existing document supplemented by the NOR may be used in manufacture.			
		(2) Revised document must be received before manufacturer may incorporate this change.			
		(3) Custodian of master document shall make above revision and furnish revised document.			
b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT			c. TYPED NAME ( <i>First, Middle Initial, Last</i> )		
d. TITLE Chief, Electronic Components Branch		e. SIGNATURE Kendall A. Cottongim		f. DATE SIGNED (YYMMDD) 95-04-11	
15a. ACTIVITY ACCOMPLISHING REVISION  DESC-ELDT		b. REVISION COMPLETED ( <i>Signature</i> )  Steve L. Duncan		c. DATE SIGNED (YYMMDD) 95-04-11	

REVISIONS																			
LTR	DESCRIPTION										DATE (YR-MO-DA)				APPROVED				
A	Changed to reflect MIL-H-38534 processing. Editorial changes throughout.										92-03-23				K.A. Cottongim				
THE ORIGINAL FIRST PAGE DRAWING HAS BEEN REPLACED.																			
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REV STATUS OF SHEETS				REV		A	A	A	A	A	A	A	A	A					
				SHEET		1	2	3	4	5	6	7	8	9					
PMIC N/A				PREPARED BY Charles E. Besore						DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444									
STANDARDIZED MILITARY DRAWING  THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A				CHECKED BY D. A. DiCenzo															
				APPROVED BY Robert P. Evans															
				DRAWING APPROVAL DATE 87-11-10															
				REVISION LEVEL  A						SIZE A	CAGE CODE 67268		5962-87617						
						SHEET		1		OF		9							

## 1. SCOPE

1.1 Scope. This drawing describes device requirements for class H hybrid microcircuits to be processed in accordance with MIL-H-38534.

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

<u>5962-87617</u>	<u>01</u>	<u>X</u>	<u>X</u>
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Drawing number	Device type (See 1.2.1)	Case outline (See 1.2.2)	Lead finish per MIL-H-38534

1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	0006	1.5 amperes, high voltage driver
02	0008	3.0 amperes, high voltage, high current driver

1.2.2 Case outline(s). The case outline(s) shall be as designated in appendix C of MIL-M-38510, and as follows:

<u>Outline letter</u>	<u>Case outline</u>
X	See figure 1 (10-lead, .370" x .185"), can package

1.3 Absolute maximum ratings. 1/

Peak power supply voltage ( $V_P$ ), for less than 0.1 s - -	+60 V dc
Continuous supply voltage ( $V_S$ ) - - - - -	+45 V dc
Input voltage ( $V_{IN}$ ) - - - - -	+5.5 V dc
Input extender current ( $I_X$ ) - - - - -	5.0 mA
Peak output current ( $I_{OUT}$ ), 50 ms on, 1 s off:	
Device type 01 - - - - -	1.5 A
Device type 02 - - - - -	3.0 A
Continuous output current ( $I_{OUTC}$ ):	
Device type 01 - - - - -	0.4 A
Device type 02 - - - - -	0.5 A
Thermal resistance, junction-to-case ( $\Theta_{JC}$ ) - - - - -	(See MIL-M-38510, appendix C)
Power dissipation ( $P_D$ ), $T_A = +25^\circ\text{C}$ :	
Device type 01 - - - - -	750 mW 2/
Device type 02 - - - - -	950 mW 2/
Junction temperature ( $T_J$ ) - - - - -	+175°C
Storage temperature range - - - - -	-65°C to +150°C
Lead temperature (soldering, 10 seconds) - - - - -	+300°C

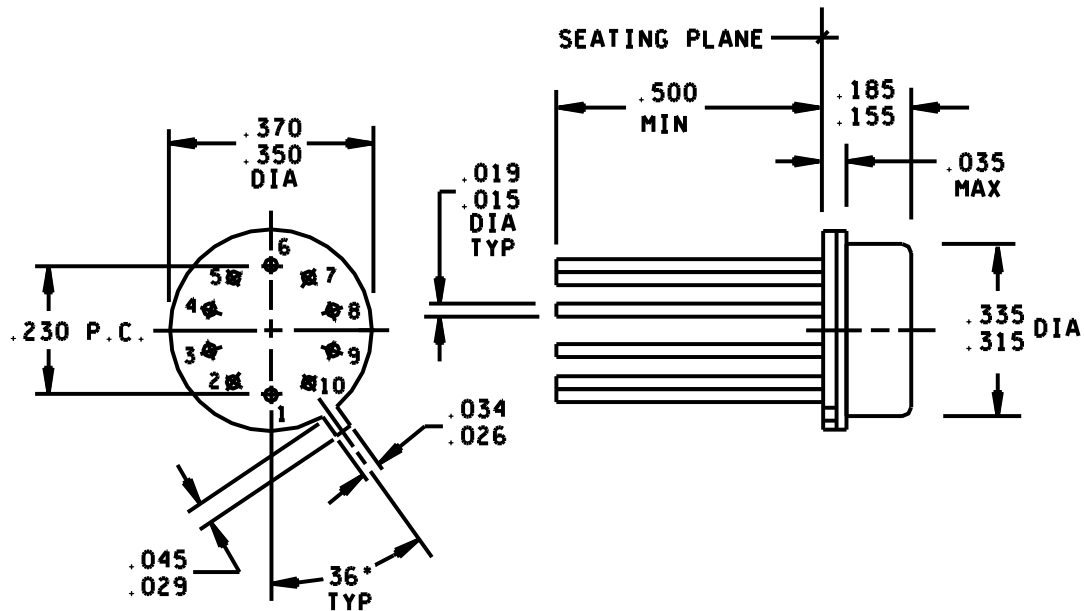
1.4 Recommended operating conditions.

Ambient operating temperature range ( $T_A$ ) - - - - -	-55°C to +125°C
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1/ Unless otherwise specified, all voltages are referenced to ground.

2/ Derate at 210°C/W above  $T_A = +25^\circ\text{C}$ .

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Inches	mm		Inches	mm
.015	0.38		.185	4.70
.019	0.48		.230	5.84
.026	0.66		.315	8.00
.029	0.74		.335	8.51
.034	0.86		.350	8.89
.035	0.89		.370	9.40
.045	1.14		.500	12.70
.155	3.94			

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 1. Case outline.

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5962-87617

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**A**

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**3**

## 2. APPLICABLE DOCUMENTS

2.1 Government specifications and standard. Unless otherwise specified, the following specifications and standard of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

### SPECIFICATIONS

#### MILITARY

- MIL-M-38510 - Microcircuits, General Specification for.
- MIL-H-38534 - Hybrid Microcircuits, General Specification for.

### STANDARD

#### MILITARY

- MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specifications and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

## 3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-H-38534 and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-H-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

3.2.2 Terminal connections and functional diagram. The terminal connections and functional diagram shall be as specified on figure 2.

3.2.3 Switching time waveforms. Switching time waveforms shall be as specified on figure 3.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full specified operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-H-38534. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in QML-38534 (see 6.6 herein).

3.6 Manufacturer eligibility. In addition to the general requirements of MIL-H-38534, the manufacturer of the part described herein shall submit for DESC-ECT review and approval electrical test data (variables format) on 22 devices from the initial quality conformance inspection group A lot sample, produced on the certified line, for each device type listed herein. The data should also include a summary of all parameters manually tested, and for those which, if any, are guaranteed.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in QML-38534 (see 6.6 herein). The certificate of compliance submitted to DESC-ECT prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-H-38534 and the requirements herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-H-38534 shall be provided with each lot of microcircuits delivered to this drawing.

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		REVISION LEVEL <b>A</b>	SHEET <b>4</b>

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55° C ≤ T <sub>A</sub> ≤ +125° C (unless otherwise specified)	Device types	Group A subgroups	Limits		Unit
					Min	Max	
Logical "1" input voltage	V <sub>IH</sub>	10 V ≤ V <sub>CC</sub> ≤ 45 V	01,02	1,2,3	2.0		V
Logical "0" input voltage	V <sub>IL</sub>					0.8	
Logical "1" output voltage	V <sub>OH</sub>	V <sub>CC</sub> = 10 V, V <sub>IN</sub> = 2 V, I <sub>OUT</sub> = 150 mA	01	1,2,3	8.8		
		V <sub>CC</sub> = 28 V, V <sub>IN</sub> = 2 V, I <sub>OUT</sub> = 400 mA			26.5		
		V <sub>CC</sub> = 28 V, V <sub>IN</sub> = 2 V, I <sub>OUT</sub> = 800 mA	02		26.5		
		V <sub>CC</sub> = 45 V, V <sub>IN</sub> = 2 V, I <sub>OUT</sub> = 1.6 A			43.0		
Logical "0" output voltage	V <sub>OL</sub>	V <sub>CC</sub> = 45 V, V <sub>IN</sub> = 0.8 V, R <sub>L</sub> = 1 kΩ	01	1,2,3		10	mV
			02			100	
Logical "1" input current	I <sub>IH</sub>	V <sub>CC</sub> = 45 V, V <sub>IN</sub> = 2.4 V	01,02	1,2,3		5.0	μA
		V <sub>CC</sub> = 45 V, V <sub>IN</sub> = 5.5 V	01,02			100	
Logical "0" input current	I <sub>IL</sub>	V <sub>CC</sub> = 45 V, V <sub>IN</sub> = 0.4 V	01,02	1,2,3	-1.0		mA
Input breakdown 1/ voltage	B <sub>VIN</sub>		01,02	1,2,3	5.5		V
"Off" power supply current	I <sub>CC</sub>	V <sub>CC</sub> = 45 V, V <sub>IN</sub> = 0.8 V	01	1,2,3		2.0	mA
	(off)	V <sub>CC</sub> = 45 V, V <sub>IN</sub> = 0 V	02			2.0	
"On" power supply current	I <sub>CC</sub> (on)	V <sub>CC</sub> = 45 V, V <sub>IN</sub> = 2 V, I <sub>OUT</sub> = 0 mA	01,02	1,2,3		8.0	

See footnotes at end of table.

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SIZE  
**A**

5962-87617

REVISION LEVEL  
**A**

SHEET  
**5**

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$ (unless otherwise specified)	Device types	Group A subgroups	Limits		Unit
					Min	Max	
Rise time <u>2/</u>	$t_r$	$V_{CC} = 28\text{ V}$ , $V_{IN} = 5\text{ V}$ , $R_L = 82\Omega$ , see figure 3	01	9,10,11		300	ns
		$V_{CC} = 28\text{ V}$ , $V_{IN} = 5\text{ V}$ , $R_L = 39\Omega$ see figure 3	02			500	
Fall time <u>2/</u>	$t_f$	$V_{CC} = 28\text{ V}$ , $V_{IN} = 5\text{ V}$ , $R_L = 82\Omega$ , see figure 3	01	9,10,11		1.5	$\mu\text{s}$
		$V_{CC} = 28\text{ V}$ , $V_{IN} = 5\text{ V}$ , $R_L = 39\Omega$ , see figure 3	02	9, 11		4.0	
				10		6.0	
Turn on time <u>2/</u>	$t_{on}$	$V_{CC} = 28\text{ V}$ , $V_{IN} = 5\text{ V}$ , $R_L = 82\Omega$ , see figure 3	01	9,10,11		1.0	
		$V_{CC} = 28\text{ V}$ , $V_{IN} = 5\text{ V}$ , $R_L = 39\Omega$ , see figure 3	02			1.0	
Turn off time <u>2/</u>	$t_{off}$	$V_{CC} = 28\text{ V}$ , $V_{IN} = 5\text{ V}$ , $R_L = 82\Omega$ , see figure 3	01	9,10,11		5.2	
		$V_{CC} = 28\text{ V}$ , $V_{IN} = 5\text{ V}$ , $R_L = 39\Omega$ , see figure 3	02	9, 11		10	
				10		14	

1/ Parameter shall be tested as part of device initial characterization and after design and process changes. Parameter shall be guaranteed to the limits specified in table I for all lots not specifically tested.

2/ Subgroups 10 and 11 shall be tested as part of device initial characterization and after design and process changes. Parameter shall be guaranteed to the limits specified in table I for all lots not specifically tested.

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SIZE  
**A**

5962-87617

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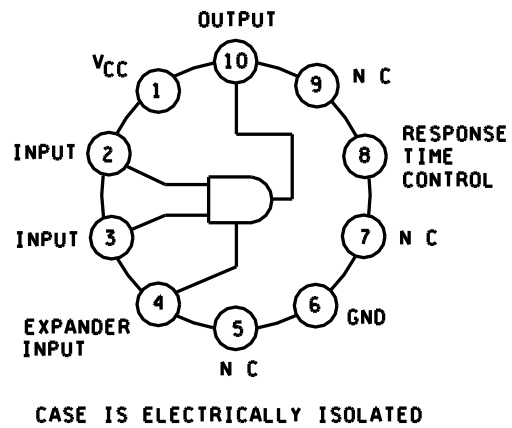
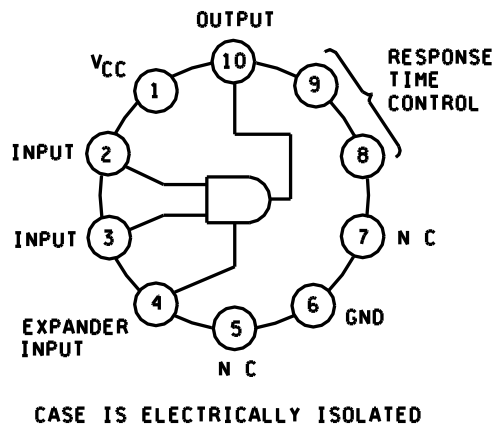


FIGURE 2. Terminal connections and functional diagram (top view).

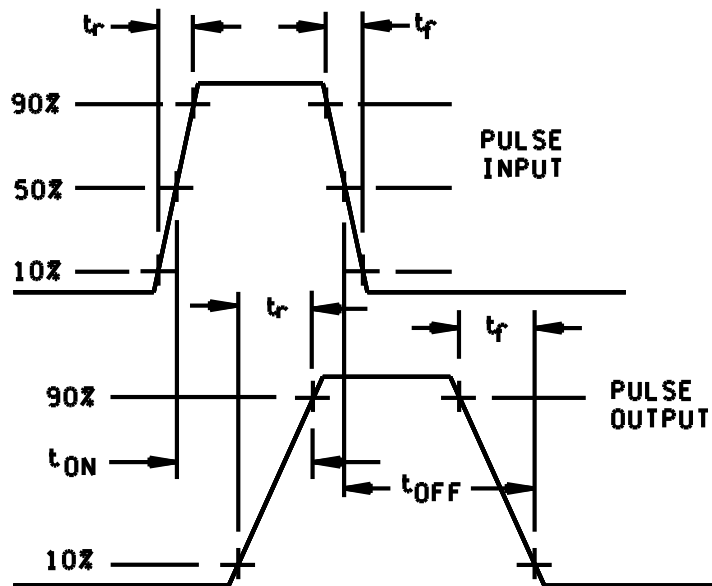


FIGURE 3. Switching time waveforms.

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SIZE  
**A**

5962-87617

REVISION LEVEL  
**A**

SHEET  
**7**



#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-H-38534.

4.2 Screening. Screening shall be in accordance with MIL-H-38534. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.7 herein).

(2)  $T_A$  as specified in accordance with table I of method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-H-38534 and as specified herein.

4.3.1 Group A inspection. Group A inspection shall be in accordance with MIL-H-38534 and as follows:

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, 6, 7, and 8 shall be omitted.

4.3.2 Group B inspection. Group B inspection shall be in accordance with MIL-H-38534.

4.3.3 Group C inspection. Group C inspection shall be in accordance with MIL-H-38534 and as follows:

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.7 herein).

(2)  $T_A$  as specified in accordance with table I of method 1005 of MIL-STD-883.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection. Group D inspection shall be in accordance with MIL-H-38534.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5008, group A test table)
Interim electrical parameters	1
Final electrical test parameters	1*, 2, 3, 9
Group A test requirements	1, 2, 3, 9, 10, 11
Group C end-point electrical parameters	1, 2, 3

\* PDA applies to subgroup 1.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		5962-87617
		REVISION LEVEL <b>A</b>	SHEET <b>8</b>

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-H-38534.

## 6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for original equipment design applications and logistic support of existing equipment.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-ECT, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-ECT, Dayton, Ohio 45444, or telephone (513) 296-5374.

6.6 Approved sources of supply. Approved sources of supply are listed in QML-38534. Additional sources will be added to QML-38534 as they become available. The vendors listed in QML-38534 have agreed to this drawing and a certificate of compliance (see 3.7 herein) has been submitted to and accepted by DESC-ECT.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		<b>5962-87617</b>
		REVISION LEVEL <b>A</b>	SHEET <b>9</b>